IMPLANTABLE PERCUTANEOUS STIMULATION LEAD WITH LEAD CARRIER

CROSS-REFERENCE

[01] This disclosure is related to the following co-pending applications entitled "Implantable Percutaneous Stimulation Lead With Interlocking Elements" by inventors Vinup et al., Attorney Docket No. P10259.00 filed on September 20, 2001, "Surgical Lead Body" by inventor Cross, Serial No. 09/500,201 filed February 8, 2000, "Apparatus And Method For Percutaneous Implant Of A Paddle Style Lead" by Redko et al., Serial No. 09/302,694 filed April 30, 1999, which are not admitted as prior art with respect to the present disclosure by its mention in this section.

FIELD OF THE INVENTION

[02] This invention relates to a medical device and more particularly to a neurological stimulation lead that can be implanted in a human body.

BACKGROUND OF THE INVENTION

[03] The medical device industry produces a wide variety of electronic and mechanical devices such as neurological stimulators, therapeutic substance infusion pumps, pacemakers, and defibrillators for treating patient medical conditions such as pain, movement disorders, functional disorders, spastisity, cancer, and cardiac disorders. Medical devices can be configured to be surgically implanted or connected externally to the patient receiving treatment and can be used either alone or in combination with pharmaceutical therapies and surgery to treat patient medical conditions. For certain medical conditions, medical devices provide the best and sometimes the only therapy to restore an individual to a more healthful condition and a fuller life. One type of medical device is an implantable neurological stimulation system which typically includes a neurostimulator, an electrical stimulation lead, and an extension such as shown in Medtronic, Inc. brochure "Implantable Neurostimulation System" (1998). An implantable neurological stimulation system delivers electrical pulses to tissue such as neurological tissue or muscle to treat a medical condition.

[04] One application of neurological stimulation systems is for spinal cord stimulation (SCS) to treat chronic pain. In many cases, the leads used for SCS are implanted percutaneously, through a large needle inserted into the epidural space. When a percutaneous lead is used for SCS, there can be undesirable current flow into areas of the patient's anatomy away from the spinal cord, because the electrodes typically cover the circumference of the stimulation lead. Additionally, dual percutaneous lead implants are becoming more common in the clinical practice of SCS. Currently, most dual lead systems are implanted as two individual single lead implants (i.e., two separate needle sticks, two separate lead insertions). Implanting dual leads in this way makes it difficult to control the relative position of the two leads with respect to one another. Currently, the physician typically uses fluoroscopy to determine the relative position of the two leads, and must try to assure that the leads do not touch (leading to a potential short between electrodes) and also that the leads are not too far apart (resulting in less than optimal stimulation). To prevent shorting, one approach has been to stagger the electrode contacts, rather than placing them adjacent on the parallel leads. In addition to being difficult to position at the time of implant, once the leads are permanently implanted, there is no guarantee that the leads will not move relative to one another (i.e., migrate) potentially reducing therapy efficacy.

[05] For the foregoing reasons, what is needed is an electrode shield that can be attached to a stimulation lead to limit current flow to a selected area around the electrode, and a means for coupling more that one lead together in a controlled fashion.

BRIEF SUMMARY OF THE INVENTION

[06] An implantable neurological stimulation lead with lead carrier has a lead carrier with an attachment detail for coupling to a first lead body first distal end and an electrode shield to insulate a portion of the electrode. The first lead body has an outer body, a first distal end, and a first proximal end. The first lead body includes at least one electrode carried on the first distal end, at least one electrical connector carried on the first proximal end, and at least one conductor electrically connecting the electrode to the electrical connector and insulated by the lead body. The implantable neurological stimulation lead with lead carrier has many embodiments and methods of operation.

BRIEF DESCRIPTION OF THE DRAWINGS

[07] FIG. 1 shows a neurological stimulation system environment embodiment;

[08] FIG. 2a shows a lead carrier configured for a single stimulation lead having a single lead clip embodiment;

[09] FIG. 2b shows a cross-section of FIG. 2a;

[10] FIG. 3a shows a lead carrier configured for a single stimulation lead having a single lead ring embodiment;

[11] FIG. 3b shows a cross-section of FIG. 3a;

[12] FIG. 4a shows a lead carrier configured for two stimulation leads having a dual medical clip embodiment;

[13] FIG. 4b shows a cross-section of FIG. 4a;

[14] FIG. 5a shows a lead carrier configured for two stimulation leads having a dual lead clip embodiment;

[15] FIG. 5b shows a cross-section of FIG. 5a;

[16] FIG. 6a shows a lead carrier configured for two stimulation leads having a dual lead sleeve embodiment;

[17] FIG. 6b shows a cross-section of FIG. 6a;

[18] FIG. 7a (prior art) shows a example of an electrical field of a percutaneous stimulation lead;

[19] FIG. 7b shows a prophetic example of an electrical field of a percutaneous lead with a lead carrier embodiment; and,

[20] FIG. 8 shows a flow chart of a method for attaching a lead carrier to a neurological stimulation lead embodiment.